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Time orientation in languages and agency costs

Richard Yeboah [a,*,1], George Nyantakyi [b,2], Ali Meftah Gerged [c,3]

[a] University of Leicester Business School, University of Leicester, United Kingdom
[b] School of Accounting, Zhongnan University of Economics and Law, Wuhan, China
[c] Sheffield University Management School, The University of Sheffield, Sheffield, United Kingdom

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ABSTRACT

Despite growing interest in the institutional and cultural determinants of corporate governance, limited attention has been paid to how language structure, particularly Future Time Reference (FTR), shapes agency dynamics. This study addresses this gap by integrating agency theory with the principle of linguistic relativity to examine how FTR—a grammatical feature that affects how languages express the future—impacts agency costs across firms and countries. Building on the premise that language influences temporal cognition, we argue that weak-FTR environments reduce the salience of future outcomes, thereby increasing temporal ambiguity in managerial decision-making and elevating agency costs. Using a panel of 20,225 firm-year observations across 17 countries from 2008 to 2020, we find that firms operating in weak-FTR language contexts experience significantly higher agency costs. However, this effect is not deterministic: it is mitigated by two key governance mechanisms. First, managerial risk perception moderates the relationship by reducing ambiguity-driven discretion among risk-averse executives. Second, institutional ownership functions as an external control mechanism, attenuating the adverse cognitive effects of weak-FTR through enhanced monitoring and accountability. By establishing language as a structural yet overlooked antecedent of agency costs, this study contributes to a deeper understanding of cross-national governance variation. It expands agency theory beyond economic incentives to include cognitive-linguistic framing, offering practical implications for multinational firms and policymakers designing governance systems in linguistically diverse contexts.

1. Introduction

Language serves not merely as a tool for communication but as a cognitive framework that structures perception, reasoning, and behavior (Whorf, 1956). Rooted in this view, the linguistic relativity hypothesis suggests that the grammatical features of a language can systematically influence cognition (Boroditsky, 2001; Chen, 2013). Given that corporate decision-making is an inherently cognitive process (Dane & Pratt, 2007; Kiss et al., 2020), it follows that linguistic structures may shape how managers frame decisions, anticipate outcomes, and evaluate trade-offs—ultimately influencing firm-level governance practices.

Agency costs—defined as the residual losses arising from misaligned interests between managers and shareholders (Jensen & Meckling, 1976)—represent a central governance concern. While prior research has established the impact of institutional, legal, and cultural environments on agency dynamics (Aguilera & Jackson, 2003; Porta et al., 1998), less attention has been paid to how foundational cognitive mechanisms, such as language, influence managerial behavior in this domain. Recent studies suggest that linguistic structures can influence savings behavior (Chen, 2013), financial disclosure (Na & Yan, 2022), tax planning (Cheng et al., 2022), and even default risk (Ho et al., 2023), yet their role in shaping agency costs remains underexplored. This is a critical oversight, as agency costs are not only economically consequential but also sensitive to indirect behavioral biases in executive decision-making (Wiseman & Gomez-Mejia, 1998).

Among the various dimensions of linguistic relativity, Future Time Reference (FTR)—the degree to which a language grammatically distinguishes future from present events—stands out as particularly relevant for understanding agency problems. FTR affects how speakers mentally represent future outcomes. In this context, weak-FTR

* Corresponding author.
E-mail addresses: ry79@leicester.ac.uk (R. Yeboah), 202241260011@stu.zuel.edu.cn (G. Nyantakyi), a.m.gerged@sheffield.ac.uk (A.M. Gerged).
[1] OrCid ID:https://orcid.org/0000-0001-9055-5461.
[2] OrCid ID: https://orcid.org/0009-0003-2485-6364.
[3] OrCid ID: https://orcid.org/0000-0001-6805-2737.

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languages (e.g., German, Chinese) grammatically conflate present and future, fostering a sense of immediacy, whereas strong-FTR languages (e.g., English, French) impose grammatical separation, rendering the future more psychologically distant (Chen, 2013). While weak-FTR has been associated with long-term financial behavior at the individual level (Chen et al., 2017; Kim et al., 2017), we argue that in the context of corporate governance, the very same linguistic imprecision can introduce temporal ambiguity—making it harder for managers to anticipate, signal, and be held accountable for future outcomes. This may heighten agency costs by increasing information asymmetry, complicating oversight, and encouraging managerial behaviors that deviate from optimal shareholder-aligned performance (Dimmock et al., 2016; Klingebiel & Zhu, 2023).

This study advances a novel theoretical proposition, indicating that FTR acts as a structural cognitive antecedent of agency costs, particularly through its effect on temporal framing and decision ambiguity. We argue that the influence of FTR on governance is not deterministic but contingent on contextual and organizational mechanisms that shape managerial behavior. In particular, we identify two key moderating factors. First, managerial risk perception—the degree to which managers perceive temporal ambiguity as a threat versus an opportunity—can condition the relationship between FTR and agency costs. Drawing on behavioral agency theory (Wiseman & Gomez-Mejia, 1998), we posit that risk-averse managers may implement stricter controls and governance practices in response to linguistic ambiguity, thereby reducing its adverse effects. Second, institutional ownership provides *another monitoring* mechanism that can override linguistically driven biases by imposing greater accountability, particularly in weak-FTR environments (Chung & Zhang, 2011; Cleary & Wang, 2017).

Our study contributes to several research streams. First, we extend agency theory by integrating it with linguistic relativity to theorize how FTR shapes managerial cognition and, in turn, agency costs. Specifically, weak-FTR structures make future outcomes less temporally distinct, increasing decision ambiguity and reducing accountability, thereby heightening agency conflicts. Second, by empirically validating this link across 20,225 firm-year observations from 17 countries (2008–2020), we introduce language structure as a cognitively grounded antecedent of governance variation rather than merely an environmental correlate, thereby expanding the behavioral foundations of agency theory. Third, we show that this effect is not universal but contingent on governance conditions, as managerial risk perception mitigates the ambiguity-driven rise in agency costs. At the same time, institutional ownership constrains it through enhanced monitoring. These findings clarify *when* and *why* linguistic framing strengthens or weakens agency conflicts. Finally, we position language as an important yet context-dependent factor—complementary to institutions and culture—in explaining cross-national diversity in corporate governance (Berman et al., 2022; Tenzer et al., 2017).

2. Literature review and hypothesis development

2.1. Language, cognition and economic behavior

Language is deeply connected with how people think, evaluate choices, and respond to their surroundings. It shapes patterns of perception and reasoning in ways that go beyond other social influences, such as education or culture (Boroditsky, 2001; Hofstede et al., 2010). One important linguistic feature in this regard is FTR—the grammatical distinction between present and future events. In strong-FTR languages, such as English or French, speakers are required to mark the future explicitly ("will," "shall"), while in weak-FTR languages, such as Mandarin or German, future events are often expressed using present-tense forms. This slight difference alters how people mentally represent time. Specifically, when the future feels closer to the present, individuals tend to think about future outcomes as part of their current reality (Chen, 2013; Declerck, 1991).

A growing body of research supports this view. Speakers of weak-FTR languages generally save more, borrow less, and show a stronger orientation toward long-term outcomes (Chen, 2013; Kim et al., 2017). More recently, these linguistic structures have been tied to firm-level behaviors—such as corporate tax avoidance, disclosure transparency, and risk management—suggesting that language not only shapes individual preferences but also organizational choices (Cheng et al., 2022; Na & Yan, 2022). Collectively, these studies point to language as a cognitive framing device that guides how both individuals and firms weigh immediate trade-offs against future rewards.

Building on this foundation, we integrate linguistic relativity theory and agency theory to explain how linguistic structures, particularly FTR, may influence corporate governance outcomes. The linguistic relativity perspective, rooted in the Sapir–Whorf hypothesis, suggests that language influences habitual patterns of thought (Boroditsky, 2001; Whorf, 1956). Agency theory, on the other hand, focuses on how information asymmetry and goal divergence between managers and shareholders generate inefficiencies and monitoring costs (Eisenhardt, 1989; Jensen & Meckling, 1976). When viewed together, these frameworks offer complementary insights. Crucially, language shapes how managers perceive and process temporal information, while agency theory explains how those perceptions affect governance behavior and firm performance.

In weak-FTR settings, where grammatical distinctions between the present and future are less explicit, managers may perceive time as more continuous and less segmented. This can make the future feel cognitively "nearer," encouraging strategic patience, but it can also blur the boundaries of accountability. When commitments are framed in less temporally precise language, it becomes harder for shareholders to judge the timing and effectiveness of managerial actions, potentially raising agency costs (Cookson et al., 2020; Gao et al., 2017; Iwashita, 2022). Conversely, in strong-FTR environments, clearer linguistic markers of time encourage explicit distinctions between present and future outcomes, reinforcing accountability and aligning with agency theory's call for transparent contracting and monitoring (Hendry, 2002; Shleifer & Vishny, 1997).

Collectively, this integration of linguistic relativity and agency theory highlights a cognitive–governance channel through which FTR can influence agency costs. Linguistic relativity provides the psychological foundation—how managers perceive, frame, and communicate future outcomes—while agency theory supplies the governance logic that explains how these perceptions translate into organizational behavior. If language influences how managers perceive time and responsibility, it follows that firms embedded in weak-FTR linguistic environments may experience higher agency costs due to increased ambiguity in managerial decision-making and reduced clarity in oversight mechanisms.

2.2. Future time reference and agency costs

While prior research (e.g., Chen, 2013; Chen et al., 2017) suggests that speakers of weak-FTR languages often behave more cautiously and think further ahead, this future-oriented mindset does not necessarily align with shareholder interests. In fact, the same linguistic traits that promote patience can also introduce temporal ambiguity—an indirect imprecision in *how* the timing and responsibility for future outcomes are understood (Ho et al., 2023). In organizational settings, where effective governance depends on clear accountability and well-defined expectations, such ambiguity can unintentionally create room for misinterpretation or even managerial opportunism.

Drawing on the Sapir–Whorf hypothesis, which posits that language shapes habitual patterns of thought (Boroditsky, 2001; Whorf, 1956; Winawer et al., 2007), we argue that weak-FTR speakers often perceive future events as psychologically near and continuous with the present. This framing can blur temporal boundaries, making it less clear *when* commitments should yield results or *who* should be held accountable for them (Iwashita, 2022). From a cognitive standpoint, this may seem

trivial. Nonetheless, within the firm's governance structure, it has significant consequences. When managerial plans are described or evaluated with temporally imprecise language, forecasting and performance monitoring become more difficult, and agency costs rise.

From the perspective of agency theory (Eisenhardt, 1989; Jensen & Meckling, 1976), agency costs arise because managers and shareholders differ in their objectives and in their access to information. Language—specifically FTR—can indirectly shape these asymmetries by influencing how managers conceptualize time, risk, and reward. For instance, a manager operating in a weak-FTR linguistic environment may view future obligations as extensions of ongoing tasks rather than as discrete, measurable milestones. This cognitive framing can lead to delays in project execution, underreporting of risk, or the rationalization of strategic inaction. Each of these outcomes widens the gap between managerial behavior and shareholder expectations, increasing the firm's overall monitoring and bonding costs (Lee & Powell, 2011; Wiseman & Gomez-Mejia, 1998).

Moreover, weak-FTR speakers are often more ambiguity-averse—they prefer caution when facing uncertain outcomes (Dimmock et al., 2016; Frijns et al., 2013; Klingebiel & Zhu, 2023). Although this caution may appear prudent, it can manifest as excessive conservatism, such as holding excess cash, delaying investments, or avoiding strategic risks that could benefit the firm. These behaviors, while future-oriented in intention, may signal managerial entrenchment or resource misallocation—both classical sources of agency inefficiency (Ang et al., 2000; Lei et al., 2013).

Taken together, these arguments suggest that weak-FTR languages introduce ambiguity, thereby weakening the clarity of managerial accountability and performance evaluation. This cognitive–governance tension implies that firms embedded in weak-FTR linguistic contexts may experience higher agency costs than those in strong-FTR settings, where temporal markers reinforce the separation between present and future responsibilities and facilitate clearer monitoring. As such, we develop the following hypothesis:

H1. *Firms in countries with weak-FTR languages are associated with higher agency costs than those with strong-FTR languages.*

2.3. The moderating role of managerial risk perception

Managers are not passive carriers of linguistic influence; they interpret and act upon language-driven signals through their own cognitive and psychological filters. In weak-FTR environments—where the boundary between present and future is blurred—this becomes particularly important. The grammatical blending of time can increase uncertainty about *when* outcomes will materialise or *how* risks should be managed (Chen, 2013; Iwashita, 2022). For some managers, this ambiguity triggers caution and control; for others, it opens a window for discretion and delay.

Behavioral agency theory provides a useful lens for understanding these differences. It suggests that managerial decisions under uncertainty are shaped by *how* individuals perceive risk and potential loss (Wiseman & Gomez-Mejia, 1998). Managerial risk perception—the extent to which executives view uncertainty as a threat to be contained or as an opportunity to be exploited—thus plays a critical role in determining whether the cognitive effects of language lead to alignment or conflict within the firm (Sitkin & Pablo, 1992).

When managers perceive risk as something to be avoided, temporal ambiguity in weak-FTR settings tends to activate defensive governance responses. They may impose stricter internal controls, enhance monitoring procedures, or maintain higher levels of liquidity to buffer against unexpected outcomes (Braumann et al., 2020; McManus & Sharfman, 2022). These responses reduce managerial discretion and improve transparency, thus limiting the agency problems that can arise from linguistic imprecision. In such cases, the cognitive ambiguity induced by language is effectively neutralised by heightened internal discipline.

By contrast, when managers exhibit low risk perception, the same ambiguity may be interpreted as flexibility—a chance to postpone decisions, blur accountability, or rationalise self-serving choices (Cao et al., 2023; Chakravarti, 2017). In these circumstances, weak-FTR linguistic contexts can strengthen residual agency costs by widening the informational gap between managers and shareholders.

In this sense, managerial risk perception operates as an internal corporate governance mechanism that determines how linguistic framing translates into behavior. High-risk-perception managers are more vigilant, using control systems and conservative strategies to counter the uncertainty introduced by weak-FTR structures. Those with lower risk perception, in contrast, may see the same uncertainty as a form of strategic flexibility, inadvertently intensifying agency conflicts.

Overall, this reasoning suggests that managerial risk perception moderates the relationship between linguistic time reference and agency costs. When risk perception is high, the cognitive effects of weak-FTR are tempered by managerial caution and procedural control. When risk perception is low, linguistic ambiguity is more likely to spill over into opportunism and inefficiency. Hence, we posit the following:

H2. *The positive association between weak-FTR language environments and agency costs is attenuated in firms with high managerial risk perception.*

2.4. The moderating role of institutional investors

While linguistic framing shapes how managers perceive and act upon future-oriented decisions, its impact ultimately depends on the governance architecture that constrains or channels managerial discretion. Within this architecture, corporate governance mechanisms can be broadly divided into two categories: external and internal. External mechanisms—such as market competition, legal enforcement, and media scrutiny—operate outside the firm, exerting indirect pressure through institutional or reputational channels (Aguilera & Jackson, 2003; Filatotchev & Nakajima, 2010). Internal mechanisms, by contrast, are embedded within the firm's ownership and control structures, directly influencing managerial behavior through active monitoring and engagement (Shleifer & Vishny, 1997; Young et al., 2008).

Among these internal mechanisms, institutional ownership—the proportion of shares held by professional investors such as pension funds, mutual funds, and insurance companies—plays a particularly pivotal role. Institutional investors function not as detached outsiders but as informed insiders who possess both the capability and the incentive to closely oversee managerial decisions (Chung & Zhang, 2011). Their embeddedness within the firm's ownership structure allows them to exercise direct influence over governance practices, board accountability, and strategic oversight.

In this capacity, institutional investors enhance corporate discipline by heightening scrutiny over managerial decisions and setting expectations for transparent disclosure and consistent performance (Bena et al., 2017; Khan et al., 2005). In firms operating within weak-FTR linguistic environments, where cognitive and grammatical blending of present and future can blur temporal accountability, these investors act as a stabilising force. Their monitoring activities help to reintroduce temporal precision, ensuring that managerial actions and outcomes remain aligned with clearly defined, time-bound objectives.

From an agency theory perspective, institutional ownership reduces information asymmetry by promoting transparency and aligning managerial behavior more closely with long-term shareholder interests (Cleary & Wang, 2017; Jiraporn et al., 2008). Through active engagement—demanding detailed disclosure, insisting on measurable performance metrics, and linking compensation to observable results—institutional investors help managers maintain a disciplined approach to future-oriented decisions. When linguistic framing makes such commitments less explicit, institutional investors effectively *translate* temporal ambiguity into concrete managerial accountability.

In weak-FTR settings, where the continuity between the present and

the future may obscure responsibility and decision horizons (Chen, 2013; Iwashita, 2022), institutional ownership therefore serves as an internal corrective mechanism. By embedding sophisticated oversight within the firm's governance system, institutional investors reduce the likelihood that linguistic ambiguity will evolve into opportunistic or inefficient behavior. Firms with stronger institutional ownership are thus better equipped to preserve decision-making precision and accountability, even when operating within linguistic environments that naturally encourage interpretive flexibility.

Accordingly, we expect institutional ownership to consistently weaken the positive association between weak-FTR linguistic environments and agency costs. In firms where institutional investors hold substantial stakes, the influence of linguistic time imprecision on managerial discretion should be significantly attenuated, as internal monitoring and performance discipline counteract its cognitive effects. As such, we hypothesize the following:

H3. *The positive association between weak-FTR language environments and agency costs is attenuated in countries with high levels of institutional ownership.*

3. Data and research design

3.1. Sample and data

The country-level FTR measures are linked with firm-level financial variables by first gathering financial data from the Refinitiv Eikon Database, covering the period from 2008 to 2021, with a total of 76,643 observations. Official language FTR data is sourced from Chen (2013) and Gotti et al. (2021), while additional country-level and cultural indices are obtained from the relevant sources listed in Appendix A. To be included in our sample, the firm-year data must have all necessary details for the computation of the variables in our research design. After removing 32,024 firm-year observations with missing values required for estimating the dependent variable, further exclusions are made based on industry classifications. Specifically, 17,639 observations related to financial firms and 6725 observations related to utility firms are excluded due to differing business operations and regulatory requirements. Following these adjustments, the final dataset consists of 20,255 firm-year observations. To address the impact of extreme outliers, all continuous variables are winsorized at the 1st and 99th percentiles. Table 1 shows the detailed sample selection procedure.

3.2. Variable measurement

3.2.1. Dependent variable

Following the measure employed by Obeng et al. (2021), we use free cash flows, dividend payout ratio, expense ratio, and asset utilization as proxies to reflect agency costs, in line with Ang et al. (2000), Henry (2010), and Jurkus et al. (2011). When a firm has more funds than it needs for projects with positive net present values, there may be a conflict of interest if management misuses the extra cash (Jensen, 1986). This can result in inefficiencies. The term "agency cost of free cash flow" refers to this circumstance (Jensen, 1986). Our first measure of agency costs (FCF_{AG}) is determined by multiplying free cash flow by a growth indicator, which equals 1 when Tobin's Q is less than 1 and 0 otherwise, in accordance with the methodology employed by Jurkus et al. (2011).

Table 1
Sample selection criteria.

Criteria	No. of Observations
Full merge sample	76,643
Less: Observation with missing variables for key variables	32,024
Less: Observations for financial firms	17,639
Less: Observations for utility firms	6725
Final Sample	20,255

Higher values are indicative of higher free cash flow agency costs.

The expenses ratio is our second measure of agency expenses (ER_{AG}). Ang et al. (2000) retort that management's excessive expenditure is reflected in the expense ratio. According to previous studies (Fleming et al., 2005), the ratio of operating expenses to annual sales is used to calculate ER_{AG}. As a larger ratio of expenses to sales indicates possible management consumption of perquisites, a higher number indicates increased agency costs (Ang et al., 2000).

Following Jurkus et al. (2011), the ratio of declared dividends on common stock to net income (DPR_{AG}) is our third indicator of agency costs. They contend that when extra funds are distributed to shareholders, the dividend distribution process checks for possible overinvestment. Consequently, when DPR_{AG} is low (high), agency costs are regarded as high (low).

Finally, we use the asset turnover ratio, which is determined by dividing annual sales by total assets, as empirically confirmed by Ang et al. (2000). According to Ang et al. (2000), managers operating in self-interest may make less than ideal investments that result in reduced income or may put in less effort to generate revenue. An agency cost is created when income is reduced as a result. A lower (higher) AUR_{AG} is correlated with greater (lower) agency costs.

In order to ensure consistent interpretation, we multiply both DPR_{AG} and AUR_{AG} by -1, meaning that higher numbers signify higher levels of agency costs. We then use a principal component analysis to derive a single agency cost measure from FCF_{AG}, AUR_{AG}, ER_{AG}, and DPR_{AG}. Our main agency costs proxy is the score from the first factor in our principal component analysis, which is represented by *AC* (high).

3.2.2. Variable of interest

We use the FTR data for each language from Chen (2013), which were originally obtained from the European Science Foundation's Typology of Language in Europe (EUROTYP) project. The EUROTYP Theme Group on Tense and Aspect has designated FTR as its primary topic. This group analyzes the typological and areal distribution of grammaticalized FTR. Strong FTR languages necessitate the marking of future time in all but a limited number of situations, while weak FTR languages do not require the marking of future time in prediction-based settings. The distribution of strong and weak FTR languages among the countries is shown in Table 1 below. We also used the text-based coding of FTR for the robustness test that Chen (2013) developed.

3.2.3. Moderating variables

This study employs managerial risk perception and institutional ownership as moderators in testing hypotheses 2 (H2) and 3 (H3), respectively. We proxy managerial risk perception (RISK PERCEPTION) following the approach of Cohen et al. (2013), Kini and Williams (2012), and Wu et al. (2022). Consistent with these studies, we infer managerial risk perception from the firm's observable risk-taking behavior, where a higher level of risk perception is associated with more conservative managerial actions. To quantify this, we construct a composite index based on six firm-level characteristics measured in year $t+1$, each benchmarked against the annual sample median. Specifically, a firm receives a score of 1 for each of the following criteria: (1) R&D intensity below the sample median; (2) firm focus, proxied by the Herfindahl-Hirschman Index in sales, below the median; (3) financial leverage below the median; (4) capital expenditure intensity below the median; (5) number of employees below the median; and (6) cash holdings above the median. Each indicator reflects a more cautious or risk-averse position. The final RISK PERCEPTION score is the sum of these six binary indicators, ranging from 0 to 6, with higher values indicating greater managerial risk aversion. This approach allows for a consistent, data-driven categorization of managerial risk perception that captures heterogeneity across firms and over time.

We measure institutional ownership (*TOT INST. OWNERSHIP*) using the mean country-level institutional ownership, following Ferreira et al. (2010). This approach has also been employed in recent literature,

Table 2
Sample distribution.

Panel A: Distribution by Industry

	Freq.	Percent
Consumer non-durables	1780	8.79
Consumer durables	290	1.43
Manufacturing	5742	28.35
Oil, gas, and coal extraction and products	1015	5.01
Chemicals and allied products	2109	10.41
Business equipment – computers, software, electronic equipment	2708	13.37
Telephone and Television	13	0.06
Wholesale, retail, some services	1252	6.18
Healthcare, medical equipment, drugs	91	0.45
Other (e.g., mining, construction, transportation, hotels, business services)	5255	25.94
Total	**20,255**	**100.00**

Panel B: Distribution by Year

2008	1276	6.30
2009	1304	6.44
2010	1321	6.52
2011	1321	6.52
2012	1383	6.83
2013	1492	7.37
2014	1557	7.69
2015	1612	7.96
2016	1679	8.29
2017	1742	8.60
2018	1799	8.88
2019	1853	9.15
2020	1916	9.46
Total	**20,255**	**100.00**

Panel C: Distribution by Country

	Country	N	AC	Weak_FTR	FTR
1	Austria	198	0.257	1	Weak
2	Brazil	90	0.222	1	Weak
3	Canada	863	0.022	0	Strong
4	Chile	195	0.254	0	Strong
5	Finland	269	− 0.067	1	Weak
6	France	673	0.116	0	Strong
7	India	2283	0.003	0	Strong
8	Israel	107	− 0.119	0	Strong
9	Italy	91	0.351	0	Strong
10	Japan	7223	0.399	1	Weak
11	Mexico	278	− 0.103	0	Strong
12	New Zealand	163	− 0.066	0	Strong
13	Norway	473	− 0.038	1	Weak
14	Sweden	582	− 0.080	1	Weak
15	Turkey	45	0.126	0	Strong
16	United Kingdom	1089	− 0.108	0	Strong
17	United States	5633	− 0.073	0	Strong

The table shows the means distribution for the Agency cost (AC) measures and weak future time reference (Weak FTR). We report the mean value of the respective variables by country.

including Jia et al. (2024), to capture the broader institutional investment climate within a country. While firm-level institutional ownership would offer greater granularity, such data are not consistently available across all firms and countries in our sample. The country-level measure serves as a theoretically grounded and empirically validated proxy, reflecting the governance environment shaped by institutional investors that influences firm-level behavior. This methodological choice allows us to examine how variations in institutional ownership environments moderate the relationship between linguistic structures and agency costs across international contexts.

3.2.4. Control variables

We incorporate both firm-level and country-level control variables, drawing from prior literature (e.g., Henry, 2010; Obeng et al., 2021). Following Henry (2010) and Obeng et al. (2021), we include the following standard firm-level controls: Financial Leverage (LEV), calculated as total debt divided by total assets; Firm Size (SIZE), measured as the natural logarithm of total assets; Return on Assets (ROA), defined as net income before extraordinary items divided by total assets; and Market-to-Book Ratio (MTB), estimated as market capitalization plus total debt, divided by total assets. Given the strategic risks associated with Research & Development (R&D) and innovation activities (Kim & Lu, 2011; Hirshleifer et al., 2012), we introduce R&D Intensity (R&D), measured as the ratio of R&D expenses to total assets, and Intangible Assets (INTAN), defined as intangible assets divided by total assets. To control for external monitoring by financial analysts, we include Analyst Coverage (ANALYSTS), representing the number of analysts following a firm (e.g., Irani & Oesch, 2013; Jung et al., 2012). Recognizing the relationship between agency costs and auditor choice (Hope et al., 2012), we introduce Big 4 Auditor (BIG4), a dummy variable equal to 1 if the firm is audited by one of the Big Four audit firms and 0 otherwise. Given that persistent excess cash holdings are linked to agency costs (Lee & Powell, 2011), we control for Cashflow volatility (CASH VOL), estimated as the mean of the standard deviations of cash flow over time. The tangibility of a firm's assets affects financing capacity, liquidity, and investment strategy (Boasiako et al., 2022). Thus, we include Tangibility (TANG), measured as the ratio of property, plant, and equipment to total assets. To account for growth prospects, we also include Sales Growth (SALE GROWTH), defined as the annual sales growth rate. Corporate governance effectiveness is negatively correlated with agency costs (Rashid, 2016). To capture this effect, we include Corporate Governance Score (GOV) which obtained from Refinitiv eikon database. GOV captures the firm's governance systems and processes. Corporate liquidity ensures investment flexibility and mitigates agency conflicts (Hirth & Uhrig-Homburg, 2010; Lei et al., 2013). Therefore, we include Liquidity (LIQ), measured as the ratio of total current assets to total current liabilities. Given the significance of a firm's life cycle in agency cost theory (Yazdanfar, 2012), we control for Firm Age (FIRM AGE), measured as the natural logarithm of 1 plus the firm's age, where firm age is defined as the number of years since incorporation at time t. Transparency reduces agency costs (Obeng et al., 2021), so we control for Financial Opaqueness (FFIN), an accrual-based measure as estimated

Table 3A
Panel A – summary statistics.

	N	Mean	Std. Dev.	Min	Median	Max
AC	20,255	0.122	0.607	− 1.152	− 0.193	2.117
WEAK FTR	20,255	0.436	0.496	0.000	0.000	1.000
LEV	20,255	0.179	0.169	0.000	0.154	0.745
SIZE	20,255	21.173	1.667	16.542	21.105	25.245
ROA	20,255	0.044	0.086	− 0.692	0.045	0.270
MTB	20,255	2.294	3.552	0.084	1.241	2.666
RD	20,255	0.012	0.031	0.000	0.000	0.352
INTAN	20,255	0.066	0.116	0.000	0.003	0.670
BIG4	20,255	0.008	0.087	0.000	0.000	1.000
TANG	20,255	0.455	0.437	0.000	0.360	1.641
ANALYSTS	20,255	0.769	2.408	0.000	0.000	15.000
SALE GROWTH	20,255	0.180	1.151	− 0.750	0.034	11.400
CASH VOL	20,255	1.768	1.542	1.000	1.000	5.000
GOV	20,255	0.491	0.500	0.000	0.000	1.000
LIQ	20,255	2.110	1.535	0.211	1.703	4.665
FIRM AGE	20,255	3.338	1.098	0.000	3.555	5.130
FFIN	20,255	0.792	0.406	0.000	1.000	1.000
IFRS	20,255	0.554	0.497	0.000	1.000	1.000
GDP GROWTH	20,255	1.197	3.048	− 6.596	1.667	9.399
WGI	20,255	0.260	1.415	0.307	0.648	0.799
PDI	20,255	49.629	14.386	13.000	54.000	77.000
IDV	20,255	64.914	20.733	30.000	54.000	91.000
MAS	20,255	68.636	23.702	5.000	62.000	95.000
UAI	20,255	64.001	23.705	29.000	48.000	92.000
RISK PERCEPTION	20,255	2.114	1.162	0.000	2.000	5.000
TOT INST. OWNERSHIP	19,426	0.334	0.285	0.011	0.133	0.745

The summary statistics for the primary variables considered in this study are displayed in Panel A. We report the variables' means, minimums, maximums, and medians. AC stands for agency costs, whereas Weak FTR represent for weak future time reference. Variable definitions are detailed in Appendix A.

by Dhaliwal et al. (2012).[4] To account for reporting practices, we include IFRS Compliance (IFRS), a dummy variable equal to 1 if the firm reports under IFRS or US GAAP and 0 otherwise.

Since macroeconomic factors influence the persistence of agency problems (e.g., Pinkowitz et al., 2003; Giannetti, 2003; Orlova, 2020), we incorporate GDP Growth (GDP GROWTH), capturing the country's GDP growth rate. We consider Hofstede's Cultural Dimensions, including Power Distance Index (PDI), Masculinity Score (MAS), Individualism Score (INV), and Uncertainty Avoidance Score (UAI) (Hofstede, 2001). Lastly, we also include Worldwide Governance Indicators (WGI), representing a principal component analysis of Regulatory Quality, Rule of Law, and Control of Corruption (Bjornsen et al., 2019).

3.3. Regression model

We employ the following fixed regression model below to test our hypothesis:

$$\begin{aligned} AC_{i,t} = {} & \beta_1 Weak\ FTR_j + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 ROA_{i,t} \\ & + \beta_5 MTB_{i,t} + \beta_6 RD_{i,t} + \beta_7 INTAN_{i,t} + \beta_8 BIG4_{i,t} \\ & + \beta_9 TANG_{i,t} + \beta_{10} ANALYATS_{i,t} + \beta_{11} SALE\ GROWTH_{i,t} \\ & + \beta_{12} CASH\ VOL_{i,t} + \beta_{13} GOV_{i,t} + \beta_{14} LIQ_{i,t} \\ & + \beta_{15} FIRM\ AGE_{i,t} + \beta_{16} FFIN_{i,t} + \beta_{17} IFRS_{i,t} \\ & + \beta_{18} GDP\ GROWTH_{j,t} + \beta_{19} PDI_j + \beta_{20} IDV_j + \beta_{21} MAS_j \\ & + \beta_{22} UAI_j + \beta_{23} WGI_{j,t} + IndustryF.E + YearF.E + \varepsilon \end{aligned}$$

where *AC* denotes Agency costs, where *i* indexes firm and *t* indexes time. *j* in the model above indexes country. *Weak FTR* is the key explanatory variables measured using a dummy variable that is equal to one if the language does not differentiate the future from the present obligatorily and zero if otherwise. All other variables are discussed under control variables (Section 3.2.4 above). *Industry F. E* in the model is the industry fixed effect which control for unobserved, time-invariant differences across industries that could otherwise bias the results. *Year F. E* control for time-specific shocks that affect all firms equally in a given year but could otherwise bias the results. The error term in the model is capture by Ɛ.

4. Empirical results

4.1. Sample distribution by industry, year, and country

The sample distribution by year and industry is shown in Panel A of Table 2 using the Fama-French 12 industry classification. The manufacturing sector had the largest number of observations (5742, or 28.35 % of the total sample), followed by other industries (such as mining, building, transportation, hotels, and business services) with 5225 observations (or 25.80 %) in the sample. Observations related to business equipment make up 13.37 % of all observations. In our sample, the lowest number of observations (13) is associated with television and the telephone (0.06 %). With a value of 1276, or 6.3 %, from Panel B of Table 2, 2008 was the year with the lowest observations. On the other side, 2020 has the highest sample size, at 1916, or 9.46 % of the total.

We present the sample distribution for weak-FTR by countries in Panel C of Table 2. The geographical diversity of the study countries guarantees the generalizability of our results. Our sample sizes by country span 17 countries, with Turkey having the lowest number of 45 firm-year observation and the USA with the highest number of 5633 firm-year observations. Out of the sample, 11 countries have strong FTR, while the remaining 6 are classified as weak-FTR countries.

4.2. Descriptive statistics

In Table 3A, 3B, we report the distribution of the variables by year and industry and summary statistics. Panel A presents the descriptive statistics of all variables used in our analysis. The mean and median of *AC* are 0.122 and − 0.193, with the values consistent with that of Obeng et al. (2021). The mean value of *Weak-FTR* is 0.436, suggesting that 43.6 % of the firms are found in countries with weak-FTR languages. The value is consistent with Kim et al. (2017). The average firm size is 21.173. The mean of return on assets is 0.044. The average value of sales growth is 0.180. We observed that the mean value of firm liquidity is 2.110. These values are not quantitatively different from those of prior studies (Kim et al., 2017; Obeng et al., 2021). Regarding Country-level controls, the mean GDP growth is 1.197. Concerning Hofstede (2001) variables, the means of power distance, individualism, masculinity, and uncertainty avoidance are 49.629, 64.914, 68,636, and 64,001, respectively. The mean value of legal protection is 0.260.

Panel B of Table 3A, 3B presents the Pearson correlations among the dependent and independent variables. Our hypothesis that firms in countries whose language does not distinguish between the present and the future are linked to greater agency costs is partly supported by the positive correlation between AC and Weak-FTR at the 1 % significance level. We use a correlation matrix and the variance inflation factor (VIF) to test for multicollinearity among the explanatory variables. Based on prior studies (O'brien, 2007; Shrestha, 2020), multicollinearity is not an issue, as no correlation coefficients are higher than 0.8 between the dependent and other independent variables. We also find the mean VIF of 2.52, which suggests that the predictors in the model do not have severe multicollinearity. Regarding multicollinearity diagnostics, we follow established econometric guidelines, where a Variance Inflation Factor (VIF) exceeding 10 typically signals serious multicollinearity, and values above 5 suggest moderate concern. Consistent with recommendations from Hair et al. (2019) and Kennedy (2008), and adopting a conservative stance suggested by O'brien (2007), we treat VIF values above 4 as potential flags. In our dataset, all VIF values fall well below this conservative threshold, confirming that multicollinearity does not pose a threat to our estimates.

4.3. Test of baseline hypothesis: future time reference and agency costs

Table 4 reports the baseline results for estimating hypothesis (1), which examines the relationship between language and agency costs. We regress *AC* on *Weak-FTR* with industry and year-fixed effects in column (1). The coefficient on Weak-FTR ($\beta = 0.340$, SE = 0.072), which is statistically significant at the 1 % level. This suggests that firms in countries with weak future-time-reference (FTR) languages tend to have significantly higher agency costs, supporting our hypothesis. We added firm-level variables as further controls in column (2). The coefficient on Weak-FTR decreases to ($\beta = 0.197$, SE = 0.047) but remains statistically significant at the 1 % level, indicating that the relationship persists even after accounting for firm characteristics. In column (3), we further include country-level controls. The coefficient on Weak-FTR declines slightly to ($\beta = 0.167$, SE = 0.048) but remains significant at the 1 % level, confirming that the linguistic effect is robust to additional cross-country heterogeneity. In economic terms, the coefficient on Weak-FTR (0.167) implies that firms in weak-FTR countries exhibit agency costs that are 27.5 % of a standard deviation higher than those in strong-FTR countries, based on the standard deviation of AC (0.607). This suggests a meaningful cross-sectional difference in agency conflicts attributable to language structure.

Our findings indicate that multinational firms operating in countries where language does not distinctly express time tend to experience higher agency costs. This suggests that linguistic patterns subtly shape

[4] The measure of Financial Opaqueness (FFIN) involves using data related to current assets, current liabilities, cash, current portion of long-term debt (STD), depreciation and amortization, expenses, income taxes payable, and total assets. Refer to Dhaliwal et al. (2012) for detailed explanation.

Table 3B
Panel B – pairwise correlation.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
AC (1)	1.000													
Weak FTR (2)	0.293***	1.000												
LEV (3)	0.144***	0.137***	1.000											
SIZE (4)	0.224***	0.194***	0.076***	1.000										
ROA (5)	0.039***	0.062***	0.185***	0.196***	1.000									
MTB (6)	0.261***	0.151***	0.201***	0.174***	0.193***	1.000								
RD (7)	− 0.006	0.013*	0.193***	− 0.022***	− 0.260***	0.114***	1.000							
INTAN (8)	0.192***	0.283***	0.091***	0.180***	0.001	0.059***	0.058***	1.000						
BIG4 (9)	− 0.012*	0.063***	0.011	− 0.010	− 0.005	0.006	− 0.031***	0.015**	1.000					
TANG (9)	0.002	0.105***	0.303***	0.041***	− 0.079***	− 0.146***	− 0.144***	− 0.171***	0.037***	1.000				
ANALYSTS (10)	0.095***	0.060***	0.034***	0.248***	0.006	0.108***	0.008	0.099***	0.004	0.030***	1.000			
S.GROWTH (11)	0.029***	0.098***	− 0.010	− 0.040***	0.005	0.113***	− 0.018**	− 0.005	− 0.004	− 0.027***	− 0.034***	1.000		
CASH VOL (12)	0.114***	0.309***	0.072***	0.018**	0.082***	0.093***	− 0.143***	0.077***	0.058***	0.086***	0.032***	0.135***	1.000	
GOV (13)	− 0.152***	0.226***	0.152***	0.602***	0.010	− 0.018***	0.010	0.203***	0.037***	0.106***	0.229***	− 0.075***	0.028***	1.000
LIQ (14)	0.002	0.015**	0.268***	− 0.079***	0.072***	0.056***	0.107***	− 0.049***	0.016**	− 0.098***	− 0.028***	0.031***	− 0.052***	− 0.066***
FIRM AGE (15)	0.135***	0.283***	0.068***	0.048***	0.059***	− 0.071***	− 0.019***	− 0.176***	− 0.013*	0.005	− 0.005	− 0.016**	− 0.090***	− 0.050***
FFIN (16)	0.007	0.059***	0.021***	0.000	− 0.067***	0.013*	0.014**	− 0.042***	− 0.012*	0.024***	0.059***	0.024***	− 0.011	− 0.006
IFRS (17)	0.263***	0.532***	0.127***	0.321***	− 0.056***	0.027***	0.089***	0.433***	0.050***	0.138***	0.102***	− 0.080***	0.028***	0.400***
GDP GROW (18)	0.076***	0.282***	0.017**	− 0.027***	0.091***	0.094***	− 0.041***	0.016**	0.022***	− 0.017**	− 0.430***	0.160***	0.221***	− 0.100***
PDI (19)	0.116***	0.013*	0.047***	− 0.113***	0.110***	0.068***	− 0.138***	− 0.230***	− 0.064***	− 0.117***	− 0.028***	0.157***	0.277***	− 0.248***
IDV (20)	0.272***	.653***	0.133***	0.245***	− 0.052***	0.060***	0.103***	0.351***	0.007	0.125***	0.070***	− 0.053***	− 0.084***	0.336***
MAS (21)	0.274***	0.477***	0.097***	− 0.088***	− 0.022***	− 0.170***	0.014**	− 0.330***	− 0.062***	− 0.074***	− 0.045***	− 0.077***	− 0.346***	− 0.144***
UAI (22)	0.330***	0.740***	0.128***	− 0.126***	− 0.060***	− 0.209***	0.003	− 0.298***	− 0.032***	− 0.091***	− 0.058***	− 0.118***	− 0.293***	− 0.182***

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
LIQ (14)	1.000								
FIRM AGE (15)	− 0.011	1.000							
FFIN (!6)	0.024***	− 0.014*	1.000						
IFRS (17)	0.021***	0.349***	0.094***	1.000					
GDPGROW (18)	− 0.005	0.045***	0.043***	.032***	1.000				
PDI (19)	0.002	0.203***	0.064***	0.616***	0.213***	1.000			
IDI (20)	− 0.010	0.325***	0.039***	0.778***	0.004	0.659***	1.000		
MAS (21)	0.063***	0.355***	0.050***	0.596***	0.221***	0.231***	0.449***	1.000	
UAI (22)	0.050***	0.332***	0.014**	0.542***	0.304***	0.283***	0.704***	0.718***	1.000

Note: The research variables are operationally defined in Appendix. The correlation values between the main variables are presented in this table. Significant differences at the 10 %, 5 % and 1 % levels are donated by superscripts *, ** and ***.

Table 4
Baseline regression results (H1).

VARIABLES	*AC*		
	(1)	(2)	(3)
WEAK FTR	0.340***	0.197***	0.167***
	(0.072)	(0.047)	(0.048)
LEV		− 0.542***	− 0.541***
		(0.071)	(0.079)
SIZE		− 0.035***	− 0.044***
		(0.010)	(0.008)
ROA		0.083	0.144
		(0.105)	(0.089)
MTB		− 0.034***	− 0.030***
		(0.007)	(0.007)
RD		− 0.513	− 0.464
		(0.496)	(0.512)
INTAN		− 0.184***	− 0.127**
		(0.061)	(0.058)
BIG4		0.059	0.077
		(0.107)	(0.083)
TANG		0.037	0.036
		(0.028)	(0.030)
ANALYSTS		− 0.001	− 0.001
		(0.003)	(0.004)
SALE GROWTH		0.001	0.004
		(0.006)	(0.007)
CASH VOL		− 0.009*	− 0.003
		(0.005)	(0.004)
GOV		0.032**	0.038***
		(0.013)	(0.008)
LIQ		− 0.018**	− 0.020**
		(0.008)	(0.008)
FIRM AGE		0.011	0.002
		(0.010)	(0.008)
FFIN		− 0.014	− 0.014
		(0.014)	(0.013)
IFRS		− 0.135***	− 0.012
		(0.040)	(0.031)
GDP GROWTH			0.001
			(0.008)
PDI			0.005***
			(0.001)
IDV			0.001
			(0.002)
MAS			0.002***
			(0.001)
UAI			0.002***
			(0.001)
WGI			0.013
			(0.015)
Constant	0.248***	1.243***	0.825***
	(0.077)	(0.261)	(0.250)
Year Fixed Effect	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes
#Observations	20,255	20,255	20,255
Adj. R-squared	0.128	0.252	0.263

This table reports the main regression results. The dependent variable is agency costs (AC), and the main independent variable is weak future time reference (Weak FTR). In column (1), we present results without firm-level and country-level controls. Column (2) reports result with only firm-level controls. Column (3) reports the results with both firm level and country level controls as specified in the main model. Robust statistics errors are reported in parentheses below the coefficients. We correct standard errors by using the firm level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively. Variable definitions are provided in Appendix A.

Table 5
The moderating role of high managerial risk perception (H2).

VARIABLES	*AC*
Weak FTR	0.128**
	(0.045)
RISK PERCEPTION	− 0.018*
	(0.009)
*Weak FTR*RISK PERCEPTION*	− 0.023**
	(0.010)
LEV	− 0.495***
	(0.092)
SIZE	− 0.052***
	(0.010)
ROA	0.609**
	(0.227)
MTB	− 0.029***
	(0.008)
RD	− 1.098
	(0.854)
INTAN	− 0.069
	(0.081)
BIG4	0.082
	(0.111)
TANG	0.042
	(0.049)
ANALYSTS	− 0.001
	(0.003)
SALE GROWTH	0.020
	(0.014)
CASH VOL	− 0.005
	(0.008)
GOV	0.073***
	(0.018)
LIQ	− 0.021**
	(0.008)
FIRM AGE	0.005
	(0.013)
FFIN	− 0.018
	(0.015)
IFRS	− 0.049
	(0.037)
GDP GROWTH	− 0.001
	(0.009)
PDI	0.004***
	(0.001)
IDV	− 0.001
	(0.002)
MAS	0.002**
	(0.001)
UAI	0.003**
	(0.001)
WGI	0.032
	(0.021)
Constant	1.268***
	(0.294)
Year Fixed Effect	Yes
Industry Fixed Effect	Yes
#Observations	20,255
Adjusted R-squared	0.095

This table reports the regression results for the moderation effect of high managerial risk perception on the relationship between language and agency costs. The dependent variable is agency costs (AC), and the main independent variable is weak future time reference (Weak FTR). Robust statistics errors reported in parentheses below the coefficients. We correct standard errors by clustering at the country level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively. Variable definitions are provided in Appendix A.

managerial decisions, and strategic planning, aligning with the linguistic relativity hypothesis. Specifically, the results show that firms in weak-FTR countries face increased agency costs, implying that less precise temporal distinctions in language influence managerial decision-making horizons, which contribute to misaligned interests between managers and shareholders.

Regarding the control variables, we find that *BIG4* is positive but not significantly correlated with agency costs, whereas *LEV* and *INTAN* are negatively and statistically significantly correlated with agency costs, which is in line with the findings of Obeng et al. (2021). We also find *SIZE* to be significant and negatively correlated with agency costs, which is consistent with the findings of Rashid (2016). Concerning country-level controls, we find that power distance score, individualism score, masculinity score, and uncertainty avoidance score are

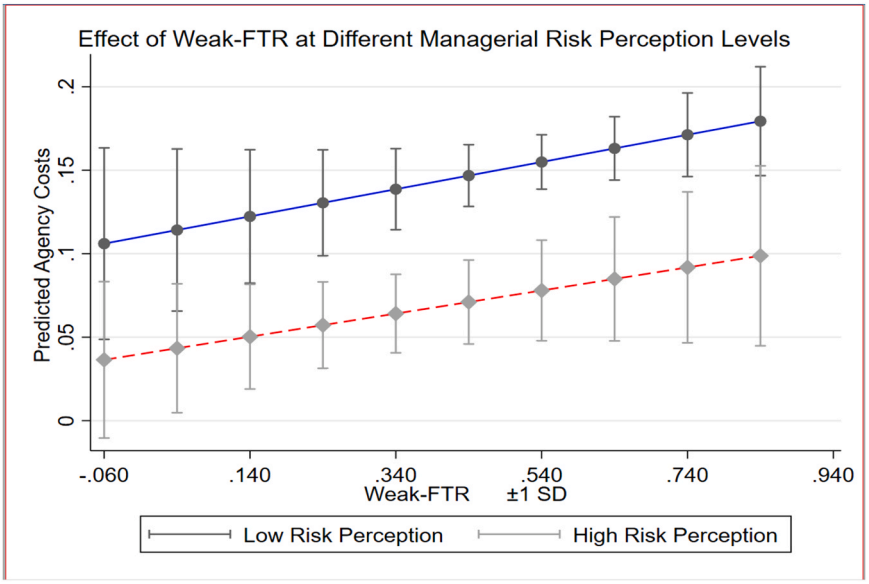

Fig. 1. Marginal effect of weak-FTR and risk perception on agency costs.

significantly and positively correlated with agency costs, consistent with the findings of Fauver and McDonald (2015), which suggest that national culture significantly affects agency costs. Our findings support our hypothesis that firms in countries with *weak FTR* languages are associated with higher agency costs than those with *strong FTR* languages.

4.4. Test of hypothesis 2: the moderating role of managerial risk perception

Presented in Table 5 is a test for our second hypothesis (H2). We contend that high-risk perception managers of firms in Weak FTR countries will have a greater tendency to avoid risk and uncertainty associated with linguistically induced time bias, leading to lower agency costs. To test our second hypothesis (H2), we proxy managerial risk perception (*RISK PERCEPTION*) by following Cohen et al. (2013) and Kini and Williams (2012). Theoretically, firms with high-risk executives invest less in research and development, are less focused on sales (as measured by the Herfindahl-Hirschman index), have less leverage, spend less on capital expenditures, employ fewer employees, and hold more cash than those with low-risk perception. We use these criteria, and, in each category, the value is 1 if a firm's specific indicator (such as R&D investment) is higher than the industry median and 0 otherwise. Next, we calculate a firm's *RISK PERCEPTION* by adding together all the individual indications (values range from 0 to 6), and we utilize this as a moderating variable in our test.[5]

The significantly negative coefficient for the Weak FTR × Risk Perception interaction ($\beta = -0.023$, SE = 0.010) in Table 5 supports our hypothesis that high-risk perception managers in weak-FTR language contexts reduce agency costs through more cautious decision-making. This aligns with behavioral agency theory (Wiseman & Gomez-Mejia, 1998), as managers' risk perceptions appear to drive their compensation for the temporal ambiguity inherent in weak-FTR languages by tightening internal controls and prioritizing transparency. The result bridges linguistic relativity and agency frameworks: while weak-FTR languages structurally decouple present actions from future consequences (Chen, 2013), heightened risk perception—rooted in stable cognitive dispositions (Sitkin & Pablo, 1992)—serves as an internal disciplinary mechanism that mitigates opportunistic behavior. By demonstrating that managerial cognition moderates the effect of language on agency costs, we refine theoretical models of governance, showing that risk perception can substitute for external monitoring in linguistically ambiguous environments. Practically, this suggests that firms in weak-FTR countries may benefit from selecting or developing risk-aware executives to counterbalance temporal biases inherent in their linguistic frameworks.

Fig. 1 presents the moderating effect of managerial risk perception on the relationship between weak-FTR language and agency costs, visualized through a marginal effects plot following Aguinis et al. (2017) and Murphy and Aguinis (2022) guidelines. The plot reveals distinct slopes for high versus low-risk perception: when managerial risk perception is high (red dashed line), a negative relationship is observed between weak FTR and agency costs, suggesting that heightened managerial risk perception may proactively mitigate agency problems stemming from linguistic ambiguity. In contrast, the flatter slope for low-risk perception (blue solid line) implies weaker governance adjustments when managers underestimate risks. Notably, the lines converge at extremely weak FTR values, indicating that unambiguous language neutralises the moderating role of risk perception. This pattern supports behavioral governance theory by demonstrating that individual cognitive traits—specifically, risk perception—systematically alter how linguistic ambiguity translates to agency costs (Westphal & Zajac, 2013). The analysis adheres to methodological best practices by focusing on ± 1 standard deviation of weak-FTR to ensure interpretability, presenting continuous (non-binary) moderation effects. These findings suggest that managerial risk perception functions as a cognitive governance mechanism, whereby heightened risk perception correlates with stronger efforts to mitigate ambiguity-related agency costs.

4.5. Test of hypothesis 3: the moderating role of institutional ownership

Table 6 presents a test of our third hypothesis (H3). We contend that institutional ownership negatively moderates the relationship between weak-FTR and owner-manager agency costs, reducing the adverse effects of language biases on managerial decision-making. To test our third hypothesis (H3), we proxy institutional ownership (*TOT INST. OWNERSHIP*) using the mean country-level institutional ownership from Ferreira et al. (2010), a proxy employed by Jia et al. (2024). We observe a significantly negative coefficient on the interaction between

[5] Following Cohen et al. (2013) and Kini and Williams (2012), this paper measures senior managers' risk perception through the firm's risk-taking behavior, consistent with Wu et al. (2022). A higher risk perception among senior managers corresponds to lower risk-taking behavior.

Table 6
The moderating role of Institutional ownership (H3).

VARIABLES	AC
Weak FTR	0.369***
	(0.069)
TOT INST. OWNERSHIP	− 0.215***
	(0.061)
Weak FTR TOT INST. OWNERSHIP*	− 0.703***
	(0.220)
LEV	− 0.547***
	(0.080)
SIZE	− 0.044***
	(0.009)
ROA	0.114
	(0.088)
MTB	− 0.030***
	(0.008)
RD	− 0.520
	(0.530)
INTAN	− 0.122*
	(0.060)
BIG4	0.044
	(0.075)
TANG	0.036
	(0.032)
ANALYSTS	− 0.002
	(0.004)
SALE GROWTH	0.004
	(0.006)
CASH VOL	0.001
	(0.005)
GOV	0.034***
	(0.007)
LIQ	− 0.020**
	(0.008)
FIRM AGE	− 0.001
	(0.007)
FFIN	− 0.015
	(0.013)
IFRS	0.006
	(0.022)
GDP GROWTH	0.000***
	(0.001)
PDI	0.003***
	(0.001)
IDV	0.002
	(0.002)
MAS	− 0.002**
	(0.001)
UAI	0.002**
	(0.001)
WGI	− 0.001
	(0.019)
Constant	1.100***
	(0.291)
Year Fixed Effect	Yes
Industry Fixed Effect	Yes
#Observations	19,426
Adjusted R-squared	0.271

We present results with both firm-level and country-level controls. Robust standard errors are reported in parentheses below the coefficients. We correct standard errors by clustering at the country level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively. Variable definitions are provided in Appendix A.

WEAK-FTR×*TOT. INST OWNERSHIP* and *AC* with a coefficient (β = -0.703, SE = 0.220). Because institutional investors offer strict monitoring and encourage improved frameworks for decision-making that mitigate the effects of innate language biases, firms in weak-FTR countries with higher levels of institutional ownership are anticipated to have lower owner-manager agency costs. Our findings contribute to the linguistic relativity hypothesis by demonstrating that weak-FTR speakers, who tend to have less precise expectations about future events, experience heightened agency costs due to temporal imprecision in decision-making. However, institutional ownership serves as a governance mechanism that mitigates this linguistic bias by enforcing stricter oversight and promoting structured decision frameworks. This aligns with agency theory, which posits that effective monitoring reduces owner-manager conflicts. The significantly negative interaction between Weak-FTR and Institutional Ownership underscores this moderating effect, suggesting that institutional investors act as *discipline* enforcers, counteracting the cognitive biases induced by language. This result is supported by Khan et al. (2005), who demonstrate how institutional ownership lowers possible agency costs. Cella (2020) provided additional support for this claim by demonstrating the impact institutional investors have on managers' choices and their association with reduced agency conflicts in corporate decisions. Overall, our results show that institutional investors help reduce manager-owner agency costs.

Fig. 2 illustrates the moderating role of institutional ownership in the relationship between weak-FTR and agency costs, employing a marginal effects plot following contemporary best practices (Aguinis et al., 2017; Murphy & Aguinis, 2022). The plot displays predicted agency costs across the empirically relevant range of weak-FTR, defined as ±1 standard deviation from its mean to focus on the most probable values while avoiding outliers. For firms with low institutional ownership (blue solid line), weak-FTR exhibits a steep negative association with agency costs, suggesting that weaker governance fails to counteract the risks posed by ambiguous forward-looking language. In contrast, the flatter slope for high institutional ownership (red dashed line) implies that strong oversight mitigates these risks, as institutional monitoring disciplines managerial behavior. The pattern supports a continuous—rather than binary—interpretation of institutional ownership's buffering effect, consistent with calls to move beyond simple dichotomies in moderation analysis (Murphy & Aguinis, 2022).

4.6. Sensitivity and robustness checks

We conducted a series of sensitivity analyses to confirm that our main results are not driven by model specification or measurement choices.

4.6.1. Alternative measures of agency costs

Consistent with prior studies (Obeng et al., 2021; Rashid, 2016), we re-estimated the baseline model using alternative proxies for agency costs, including asset utilization, free cash flow to total assets, and cash holdings. The results (Table 7) remained positive and significant, reaffirming the link between weaker FTR and higher agency costs.

4.6.2. Alternative measures of weak FTR

We further employed text-based measures of linguistic time reference (Chen, 2013), namely sentence ratio and verb ratio. The findings (Table 8) were consistent with our main results, indicating that the relationship between weak FTR and agency costs is robust to alternative linguistic measures.

4.6.3. Alternative estimation methods

To address concerns of cross-sectional and serial dependence, we estimated the model using Driscoll–Kraay, Newey–West, and Fama–MacBeth procedures. As reported in Table 9, the coefficients on weak FTR remained stable in sign and significance across all specifications, providing robustness to our conclusions.

4.7. Endogeneity tests

Although FTR is regarded as a stable linguistic feature exogenous to firm-level outcomes (Chen et al., 2017), we employed two complementary approaches to further mitigate potential endogeneity concerns.

First, entropy balancing (Hainmueller, 2012) was used to ensure covariate balance between firms in strong- and weak-FTR countries. The

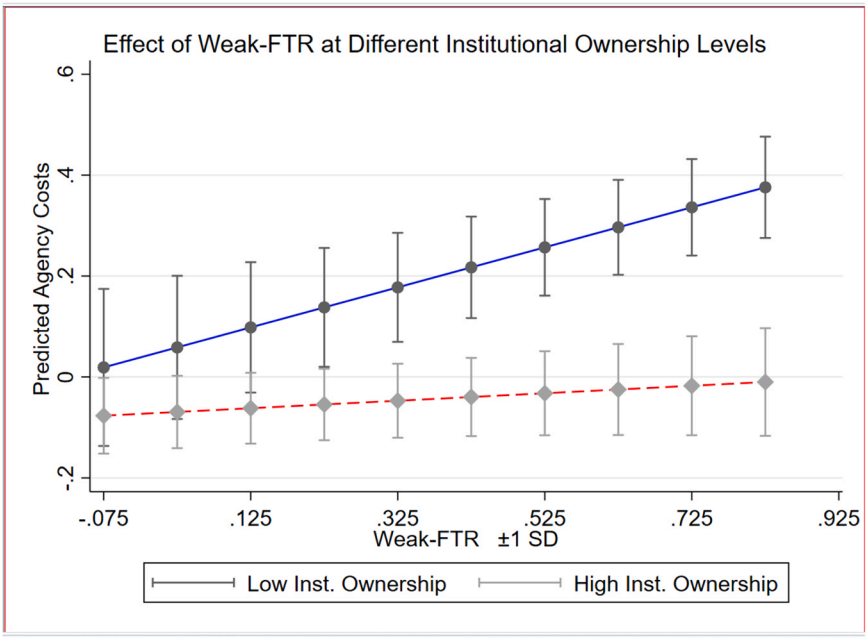

Fig. 2. Marginal effect of weak-FTR and institutional ownership on agency costs.

Table 7
Alternative agency cost measure.

VARIABLES	*AU_AC* (1)	*FCF_AC* (2)	CASH/ASSETS (3)
Weak FTR	0.302***	0.010**	0.007**
	(2.962)	(2.394)	(2.169)
Firm Controls	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes
Constant	3.162***	0.003	− 0.019
	(6.747)	(0.147)	(− 1.311)
Year Fixed Effect	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes
Observations	20,255	20,255	20,255
Adjusted R-squared	0.070	0.199	0.468

This table reports regression results using three alternative measures of agency costs, thus *CASH/ASSETS*, FCF^{AC} - (Free cash flows/total assets) × growth dummy and AUR^{AC} –the ratio of annual sales to total assets. The independent variable is weak future time reference *(Weak FTR)*. We present results with both firm-level and country-level controls. Robust t-statistics are reported in parentheses below the coefficients. We correct standard errors by clustering at country level.

Table 8
Alternative weak future time reference (weak FTR).

VARIABLES	*AC*	*AC*
Verb Ratio	0.002**	
	(2.738)	
Sentence Ratio		0.002**
		(2.841)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Constant	1.036***	0.959***
	(6.652)	(5.674)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
#Observations	17,945	17,945
Adjusted R-squared	0.248	0.246

This table reports regression results using three alternative measures of Weak FTR, thus *Sentence Ratio* and *Verb Ratio* following Chen (2013). The independent variable is weak future time reference *(Weak FTR)*. We present results with both firm-level and country-level controls. Robust t-statistics are reported in parentheses below the coefficients. We correct standard errors by clustering at country level.

reweighted results continued to support the hypothesized positive association between weak FTR and agency costs. Second, Lewbel's (2012) heteroskedasticity-based instrumental variable approach was applied to address potential omitted variable bias. Both methods yielded consistent results (Table 10), enhancing confidence in the causal interpretation of our findings.

4.8. Additional analyses

We performed several supplementary analyses to further validate our results. Excluding firms from the USA and Japan—the largest country samples—did not alter the main inferences (Table 11). The positive relationship between weak FTR and agency costs was particularly pronounced among firms with high managerial entrenchment (Table 12), suggesting that entrenched managers amplify agency frictions in weak-FTR contexts. Finally, a country-level analysis produced similar results (Table 13), reinforcing the robustness and generalizability of our findings across levels of analysis.

5. Discussion and conclusions

5.1. Discussion of key findings

This study explored how language structure can influence corporate governance outcomes. Specifically, it examined whether grammatical differences in expressing time—known as FTR—shape managerial cognition and, consequently, agency costs. The evidence from firms across seventeen linguistic environments points to a clear pattern; where languages express weaker distinctions between the present and the future, firms tend to face higher agency costs.

This finding shows that language is more than a means of communication—it shapes how people think. When a language treats the future as an extension of the present, the sense of temporal distance may diminish. Managers in such linguistic environments may, consciously or unconsciously, see long-term goals as less urgent, leading to more flexible but also more ambiguous decision-making. Over time, this linguistic framing can erode the precision of strategic commitments and weaken alignment with shareholder interests, thereby strengthening agency

Table 9
Alternative estimation and standard errors.

VARIABLES	*AC*		
	Driscoll-Kraay Estimation (1)	Fama-MacBeth Estimation (2)	Newey-West Estimation (3)
WEAK FTR	0.144***	0.154***	0.101***
	(4.373)	(6.288)	(3.758)
Firm Controls	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes
Constant	0.730***	0.415**	1.987***
	(5.714)	(3.033)	(17.814)
Year Fixed Effect	Yes	No	Yes
Industry Fixed Effect	Yes	Yes	Yes
#Observations	20,255	20,255	20,255
R-squared	0.181	0.200	0.277

This table presents the findings from regressing agency costs on the weak-FTR and control variables throughout the period of 2008–2020, utilizing alternative estimations and standard errors. Industry and year fixed effects are included in all the models. Refer to Appendix A for definitions of variables. Fama-MacBeth standard errors (models 3) and Driscoll-Kraay and Newey-West standard error correction (models 1 and 3) are the alternative estimations and standard errors. The three alternate estimations' T-statistics are shown in parenthesis

problems.

Theoretically, these findings broaden the scope of linguistic relativity by demonstrating that grammatical structures can shape not only individual cognition but also organizational behavior. They suggest that the mental templates embedded in language can cascade upward into institutional outcomes such as corporate control and governance quality. In doing so, the study refines agency theory by introducing language as a cognitive antecedent to opportunism—one that operates prior to incentive design or contractual monitoring. Language, in this sense, quietly influences how managers conceptualize time, weigh uncertainty, and signal accountability.

The moderating factors in this relationship offer an equally important insight. Managerial risk perception and institutional ownership each serve as a countervailing force against linguistic ambiguity, albeit through different mechanisms. Risk-aware managers respond to uncertainty with caution and stronger internal discipline, aligning with behavioral agency theory (Wiseman & Gomez-Mejia, 1998). Meanwhile, institutional investors impose another layer of scrutiny that restores accountability through demands for disclosure precision and measurable commitments (Cleary & Wang, 2017; Jia et al., 2024). Both mechanisms underscore how cognitive and structural governance mechanisms interact to neutralise the interpretive flexibility introduced by weak-FTR languages.

Taken together, the findings reveal that language shapes, but does not determine, governance outcomes. The grammar of time can influence how managers perceive their responsibilities, yet vigilant governance systems and informed monitoring can recalibrate those perceptions. In this way, linguistic structures form part of the invisible cultural infrastructure of corporate governance—powerful, pervasive, but ultimately governable through sound institutional design.

5.2. Theoretical implications

This study makes a conceptual step forward by integrating linguistic relativity with agency theory, offering a cognitive-linguistic explanation for cross-national variation in agency costs. We conceptualize FTR as a structural feature of language that shapes how managers mentally represent time-bound obligations. This lens broadens the theoretical foundation of agency theory, suggesting that the roots of agency problems may lie not only in misaligned incentives or information gaps but also in the cognitive architecture that shapes managers' interpretations

Table 10
Entropy balance.

Panel A: Proof of Treatment and Control Mean Conveying (Entropy Balancing)

	Before Balancing: without weighing		*After Balancing: _webal as the weighting*	
	Treat Mean	Control Mean	Treat Mean	Control Mean
LEV	0.153	0.2	0.153	0.153
SIZE	20.8	21.46	20.8	20.8
ROA	0.038	0.049	0.038	0.038
MTB	1.682	2.767	1.682	1.682
RD	0.013	0.012	0.013	0.013
INTAN	0.029	0.095	0.029	0.029
BIG4	0.001	0.013	0.001	0.001
TANG	0.403	0.496	0.403	0.403
ANALYSTS	0.604	0.897	0.604	0.604
SALE GROWTH	0.524	0.28	0.524	0.524
CASH VOL	1.227	2.187	1.227	1.227
GOV	0.362	0.59	0.362	0.362
LIQ	2.165	2.107	2.165	2.165
FIRM AGE	3.692	3.064	3.692	3.692
FINN	0.819	0.771	0.819	0.819
IFRS	0.253	0.786	0.253	0.253

Panel B: Regression result for Entropy Balance

VARIABLES	AC
Weak FTR	0.161***
	(3.485)
Firm Controls	Yes
Country Controls	Yes
Constant	0.862***
	(3.442)
Year Fixed Effect	Yes
Industry Fixed Effect	Yes
#Observations	20,255
Adjusted R-squared	0.263

Panel C: Heteroskedasticity Instrumental Variable Regression Approach

VARIABLES	*AC*
Weak FTR	0.126***
	(3.392)
Firm Controls	Yes
Country Controls	Yes
Constant	0.617***
	(3.093)
Year Fixed Effect	Yes
Industry Fixed Effect	Yes
F statistic	366.623
Cragg-Donald Wald F statistic	2718.683
10 % maximal IV size	114.82
#Observations	20,255
Adjusted R-squared	0.229

This table reports regression results based on entropy balancing and Lewbel (2012) heteroskedasticity instrument variable approach. Panel A presents the univariate comparison of means between treatment and control groups before and after balancing. Panel B presents the regression results. Robust t-statistics are reported in parentheses below the coefficients. Panel C reports the regression results for instrument variable analysis. We correct standard errors by using clustering at the country level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively. Variable definitions are provided in Appendix A.

of the future.

By introducing FTR as a cognitive antecedent of agency behavior, our framework expands agency theory beyond its traditional economic base. It suggests that temporal cognition, shaped by language, can create governance frictions even when incentives are well aligned. In weak-FTR contexts, where the future is grammatically merged with the present, managers may—often unintentionally—downplay the salience of long-term commitments or underestimate the need for clear accountability. This mechanism provides a non-economic, cognitively grounded explanation for the emergence of agency costs, one that operates alongside contractual and institutional forces.

This framework is distinct from earlier cultural and institutional perspectives (e.g., Hofstede's cultural dimensions, or legal origin

Table 11
Excluding countries with large observations.

VARIABLES	*AC*	
	Excluding USA	Excluding Japan
	(1)	(2)
Weak FTR	0.160***	0.108*
	(3.279)	(1.962)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Constant	0.819**	1.208***
	(2.713)	(6.413)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
#Observations	14,622	13,032
Adjusted R-squared	0.265	0.185

This table reports regression results after excluding large observations by country. In column (1), we exclude USA from our sample. In column (2), we report our regression results with exclusion of Japan. Robust t-statistics are reported in parentheses below the coefficients. We correct standard errors by using clustering at the country level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively.

Table 12
The role of managerial entrenchment.

VARIABLES	*AC*	
	High Managerial Entrenchment	*Low Managerial Entrenchment*
	(1)	(2)
Weak FTR	0.230***	0.084
	(4.004)	(1.738)
Firm Controls	Yes	Yes
Country Controls	Yes	Yes
Constant	0.359	− 0.397**
	(1.607)	(− 2.529)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
#Observations	7597	12,532
Adjusted R-squared	0.257	0.244

This table reports regression results of effect of high and low managerial entrenchment on the relationship between weak-FTR and *AC*. Robust t-statistics are reported in parentheses below the coefficients. We correct standard errors by using clustering at the country level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively.

theories), which locate cross-country variation in shared norms or formal systems (Aguilera & Jackson, 2003; Fligstein & Choo, 2005). In contrast, linguistic relativity operates at a more fundamental level, shaping *how* individuals encode time, responsibility, and risk before culture or institutions mediate those perceptions. Where cultural frameworks emphasise values, the linguistic framework focuses on the grammar of thought. This cognitive scaffolding shapes *how* managers perceive and prioritise intertemporal trade-offs, even in similar institutional environments.

Our findings also extend behavioral agency theory by identifying language-induced temporal cognition as a precursor to risk-related dispositions. The way managers linguistically represent the future influences how they assess uncertainty, perceive control, and respond to potential loss. Thus, language operates as a subtle but pervasive conditioning force—it does not determine behavior, but it shapes the mental frames through which agency relationships are enacted. This helps explain *why* patterns of managerial risk-taking and conservatism vary systematically across linguistic groups, even when incentive structures are comparable.

Table 13
Country-level analysis.

VARIABLES	AC
Weak FTR	0.217**
	(2.182)
Country Level LEV	− 0.642**
	(− 2.737)
Country Level SIZE	− 0.100*
	(− 2.092)
Country Level ROA	− 0.269
	(− 0.323)
Country Level MTB	− 0.065*
	(− 2.122)
Country Level RD	2.171
	(0.980)
Country Level INTAN	− 1.222***
	(− 3.331)
Country Level BIG4	− 0.293*
	(− 1.916)
Country Level TANG	0.182
	(1.330)
Country Level ANALYSTS	0.027*
	(1.906)
Country Level SALE GROWTH	0.019
	(1.167)
Country Level CASH VOL	− 0.082***
	(− 3.698)
Country Level GOV	0.036
	(0.450)
Country Level LIQ	− 0.041*
	(− 1.924)
Country Level FIRM AGE	0.059
	(1.063)
Country Level FFIN	0.123
	(1.693)
Country Level IFRS	0.025
	(0.257)
GDP GROWTH	0.004
	(0.415)
PDI	0.003*
	(1.920)
IDV	− 0.002
	(− 1.190)
MAS	0.001
	(0.878)
UAI	− 0.003
	(− 1.349)
WGI	0.286**
	(2.221)
Constant	2.258**
	(3.023)
Year Fixed Effect	Yes
Country Fixed Effect	Yes
#Observations	20,225
Adjusted R-squared	0.908

This table reports the country level analysis of our baseline regression. We conduct the country-level analysis by giving each country an equal weight. We convert all firm-level variables into country-level variables each year by taking the average of the variables across countries. Robust t-statistics are reported in parentheses below the coefficients. We correct standard errors by clustering at country level. ***, **, and * represent significance at the 1 %, 5 %, and 10 % levels, respectively. Variable definitions are provided in Appendix A.

By positioning language as a cognitive governance mechanism, we bridge economics, linguistics, and organizational behavior. This interdisciplinary integration provides a richer explanation for why governance models that function effectively in one linguistic setting may falter in another. It also opens new avenues for theorising about international governance—inviting future studies to explore *how* other linguistic features, such as modality, evidentiality, or aspect, might shape managerial cognition and corporate behavior in similarly profound ways.

Ultimately, this study encourages a broader rethinking of agency

theory. If governance problems arise partly from *how* managers linguistically experience and communicate the future, then effective solutions must go beyond contract design or board monitoring. They must also consider *how* the cognitive framing of time—rooted in language—affects the very logic of decision-making. In doing so, this work moves agency theory toward a more complete, human-centered understanding of how meaning, cognition, and structure intersect in shaping corporate governance.

5.3. Implications for policymakers and practitioners

These findings hold significant implications for policymakers, particularly in countries with weak-FTR languages. Policymakers can enhance governance frameworks by promoting practices that counterbalance the precision of beliefs about time driven by language. For example, regulatory bodies could incentivize transparency in managerial decision-making processes, mandating comprehensive reporting standards that increase accountability. Additionally, integrating more stringent financial oversight mechanisms could help reduce agency costs by ensuring managers in weak FTR contexts adhere to shareholder-oriented decision-making practices.

For practitioners, particularly institutional investors, understanding the linguistic influences on managerial decision-making can improve investment strategies. Institutional investors in weak FTR countries can enhance their monitoring practices and adopt governance mechanisms, such as performance-based executive compensation, to mitigate agency conflicts. By promoting more conservative and transparent financial practices, institutional investors can help reduce the impact of linguistic tendencies on agency costs, ultimately contributing to a more stable and predictable corporate environment.

For academia and practice, this highlights the importance of examining the intersection of language and governance mechanisms, including board independence, executive compensation, and legal enforcement. Cross-linguistic studies can further validate our framework, while policymakers and investors should account for linguistic factors when assessing governance risks.

5.4. Limitations and future research directions

While this study offers important insights into the relationship between linguistic structures and agency costs, several limitations must be acknowledged. First, the study is limited to a sample of 17 countries, which may restrict the generalizability of the findings. Future studies could expand the sample to include a more diverse set of countries and cultural contexts, examining whether the findings hold in other linguistic and economic environments.

Another limitation is the study's reliance on aggregate national language classifications, which may overlook linguistic diversity within countries. Future studies could investigate regional language variations and their effects on corporate behavior, allowing for a more nuanced understanding of how specific linguistic elements influence managerial decisions. Moreover, while this study examines the moderating roles of managerial risk perception and institutional ownership, other governance mechanisms, such as board diversity or CEO characteristics, may also play a role in mitigating agency costs in weak FTR contexts. Future research could explore these factors to provide a more comprehensive view of how linguistic structures interact with governance attributes to influence corporate outcomes. Additionally, future research should explore the impact of bilingualism and multilingualism on mitigating these linguistic effects in corporate decision-making.

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Conflicts of interest

The author whose name is listed immediately above certifies that he has NO affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Appendix. Variable definitions and data sources

	Definition	Source
Dependent Variable		
AC	Following Obeng et al. (2021), we measure agency cost using the first factor from a principal component analysis of four variables: FCF_{AG}, ER_{AG}, DPR_{AG} and AUR_{AG}. FCF_{AG} - (Free cash flows/total assets) × growth dummy, where free cash flow equals operating income before depreciation minus the sum of taxes, interest expense, and dividends paid. ER_{AG} -the ratio of operating expenses (selling, general, and administrative expenses, excluding financing expenses and any non-recurring expenses, such as losses on the sale of assets) to total annual sales. DPR_{AG} -the dividend payout ratio, i.e., the total dollar amount of dividends declared on the common stock, divided by the net income. AUR_{AG} – the ratio of annual sales to total assets	Refinitiv Eikon
CASH/ASSET	The ratio of cash holdings to total assets	Refinitiv Eikon
Independent Variables		
Weak FTR	Indicator variable which takes a value of 1 if a language does not differentiate the present and the future obligatorily, and 0 otherwise	Chen (2013)
Verb Ratio	Verb ratio from Chen (2013) × (− 1)	Chen (2013)
Sentence Ratio	Sentence ratio from Chen (2013) × (− 1)	Chen (2013)
Control Variables		
LEV	The ratio of total debt to total assets.	Refinitiv Eikon
SIZE	The natural logarithm of total assets	Refinitiv Eikon
ROA	The ratio of net income before extraordinary items to total assets.	Refinitiv Eikon
MTB	Market capitalization plus total debt, scaled by the total asset.	Refinitiv Eikon
RD	The ratio of research and development (R&D) expenditures to total assets.	Refinitiv Eikon

(*continued on next page*)

(*continued*)

	Definition	Source
ANALYST	The number of analysts following a firm at time t	Refinitiv Eikon
INTAN	Intangible assets scaled by total assets.	Refinitiv Eikon
BIG4	dummy which takes a value for one a firm is audited by one of the big four audit firms and zero if otherwise.	Refinitiv Eikon
TANG	The ratio of property, plant, and equipment to total assets	Refinitiv Eikon
GROWTH	Annual sales growth.	Refinitiv Eikon
CASH VOL	measure of the volatility of a firm's cash flow over the time	Refinitiv Eikon
	period. It is the mean of the standard deviations of the cash flow	Refinitiv Eikon
GOV	Corporate governance from Refinitiv eikon database. This measure captures the company's systems and processes on how management acts in the best interest of shareholders.	Refinitiv Eikon
LIQ	Total Current assets scaled by total current liabilities	Refinitiv Eikon
FIRM AGE	Natural log of 1 plus firm age where firm age is the number of years of a firm since date of incorporation to time t	Refinitiv Eikon
FFIN	The calculation of Financial Opaqueness (FFIN) involves using data related to current assets, current liabilities, cash, current portion of long-term debt (STD), depreciation and amortization, expenses, income taxes payable, and total assets following Dhaliwal et al. (2012)	Refinitiv Eikon
IFRS	A dummy with a value of 1 if a company reports financial information in accordance with IFRS or US GAAP and 0 if otherwise	Refinitiv Eikon
WGI	Principal component analysis of three categories of the Worldwide Governance Indicators: Regulatory Quality, Rule of Law, and Control of Corruption.	World Bank
GDP GROWTH	Growth rate in gross domestic product	World Bank
POWER DISTANCE (PDI)	Power distance score from Hofstede (2001)	Hofstede (2001)
MASCULINITY (MAS)	Masculinity score from Hofstede (2001)	Hofstede (2001)
INDIVIDUALISM (IDV)	Individualism score from Hofstede (2001)	Hofstede (2001)
UNCERTAINTY AVOIDANCE (UAI)	Uncertainty avoidance score from Hofstede (2001)	Hofstede (2001)
ENTRENCH	The Entrenchment Index 1 is formulated for companies spanning 33 countries globally over the 2008–2020 period, following the methodology outlined by Ferrell et al. (2016). It is derived by summing up five dummy variables sourced from the Refinitiv Eikon sample, reflecting the presence of various anti-takeover measures, including poison pills, golden parachutes, supermajority requirements for bylaw and charter amendments, a classified board, and other provisions. Instances of missing data are treated as zeros. This measurement aligns with the original Entrenchment Index, which had U.S. coverage, as developed by Bebchuk, Cohen, and Ferrell (2009).	Refinitiv Eikon
RISK PERCEPTION	Risk perception is measured using a composite indicator that reflects managers' risk perception. A firm is assigned a score of 1 for each of the following characteristics in year t + 1 base on the median value: lower R&D intensity, lower firm focus (as indicated by a lower Herfindahl-Hirschman Index in sales), lower leverage, lower capital expenditure intensity, fewer employees, and higher cash holdings. These individual scores are then summed to determine the overall risk perception of the company.	Refinitiv Eikon
TOT INST. OWNERSHIP	Mean country-level institutional ownership from Ferreira et al. (2010)	Ferreira et al. (2010)

Data availability

Data will be made available on request.

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